STTH1210

Ultrafast recovery - high voltage diode

Main product characteristics

$I_{F(AV)}$	12 A
V_{RRM}	1000 V
T_j	175° C
V_F (typ)	1.30 V
t_{rr} (typ)	48 ns

Features and benefits

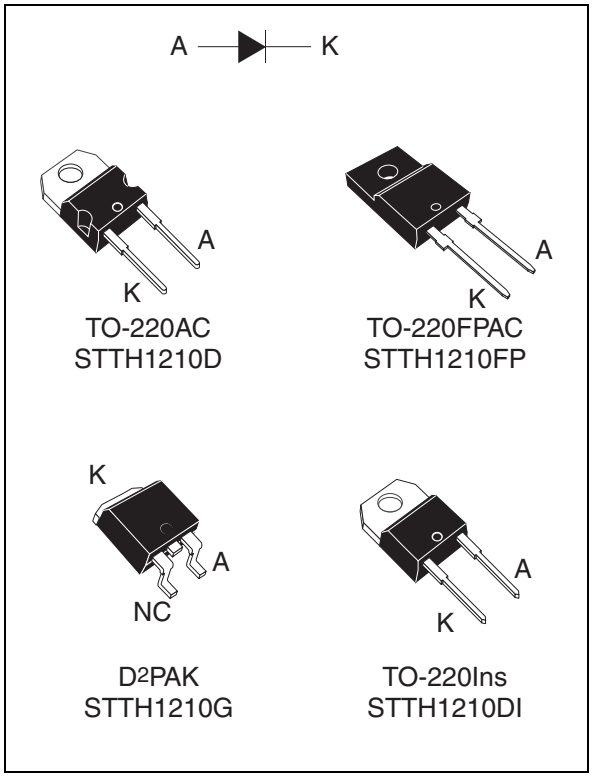
- Ultrafast, soft recovery
- Very low conduction and switching losses
- High frequency and/or high pulsed current operation
- High reverse voltage capability
- High junction temperature
- Insulated packages:
  - TO-220Ins
    Electrical insulation = 2500 V_{RMS}
    Capacitance = 7 pF
  - TO-220FPAC
    Electrical insulation = 2500 V_{RMS}
    Capacitance = 12 pF

Description

The high quality design of this diode has produced a device with low leakage current, regularly reproducible characteristics and intrinsic ruggedness. These characteristics make it ideal for heavy duty applications that demand long term reliability.

Such demanding applications include industrial power supplies, motor control, and similar mission-critical systems that require rectification and freewheeling. These diodes also fit into auxiliary functions such as snubber, bootstrap, and demagnetization applications.

The improved performance in low leakage current, and therefore thermal runaway guard band, is an immediate competitive advantage for this device.



Order codes

Part Number	Marking
STTH1210D	STTH1210D
STTH1210G	STTH1210G
STTH1210G-TR	STTH1210G
STTH1210FP	STTH1210FP
STTH1210DI	STTH1210DI

1 Characteristics

Table 1. Absolute ratings (limiting values at 25° C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			1000	V
$I_{F(RMS)}$	RMS forward current	TO-220AC / D^2PAK / TO-220FPAC		30	A
		TO-220AC Ins		20	
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	TO-220AC / D^2PAK	T_c = 125° C	12	A
		TO-220FPAC	T_c = 40° C		
		TO-220AC Ins	T_c = 95° C		
I_{FRM}	Repetitive peak forward current	t_p = 5 µs, F = 5 kHz square		120	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal		80	A
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature			175	°C

Table 2. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC / D^2PAK	1.9	°C/W
		TO-220FPAC	5.4	
		TO-220AC Ins	3.1	

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			10	µA
		T_j = 125° C			3	30	
V_F(2)	Forward voltage drop	T_j = 25° C	I_F = 12 A			2.0	V
		T_j = 100° C			1.40	1.8	
		T_j = 150° C			1.30	1.7	

1. Pulse test: t_p = 5 ms, $\delta < 2$ %
2. Pulse test: t_p = 380 µs, $\delta < 2$ %

To evaluate the conduction losses use the following equation:
$P = 1.3 \times I_{F(AV)} + 0.033\ I_F{}^2{}_{(RMS)}$

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1 A, dI_F/dt = -50 A/µs, V_R = 30 V, T_j = 25° C		67	90	ns
		I_F = 1 A, dI_F/dt = -100 A/µs, V_R = 30 V, T_j = 25° C		48	65	
I_{RM}	Reverse recovery current	I_F = 12 A, dI_F/dt = -200 A/µs, V_R = 600 V, T_j = 125° C		15	20	A
S	Softness factor	I_F = 12 A, dI_F/dt = -200 A/µs, V_R = 600 V, T_j = 125° C		2		
t_{fr}	Forward recovery time	I_F = 12 A dI_F/dt = 50 A/µs V_{FR} = 1.5 x V_{Fmax}, T_j = 25° C			400	ns
V_{FP}	Forward recovery voltage	I_F = 12 A, dI_F/dt = 50 A/µs, T_j = 25° C		5		V

Figure 1. Conduction losses versus average current

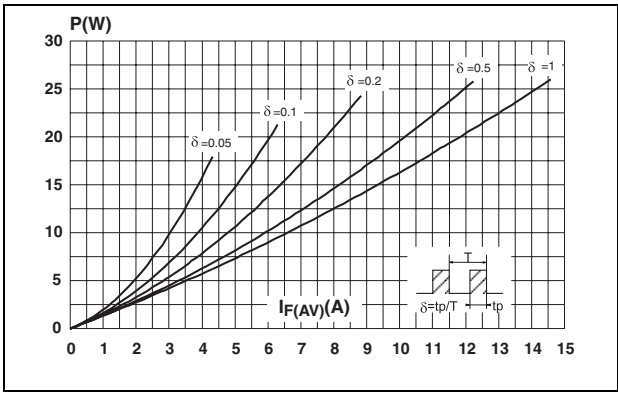


Figure 2. Forward voltage drop versus forward current

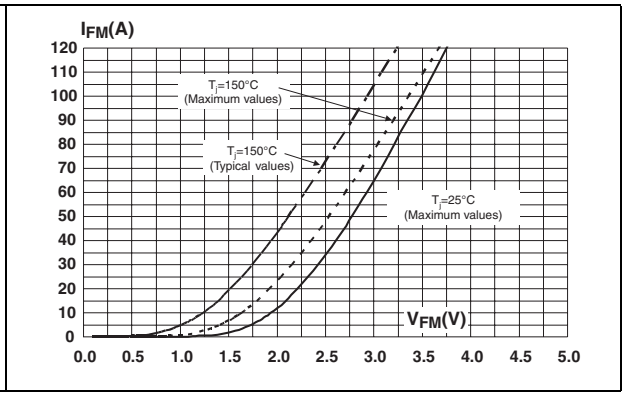


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

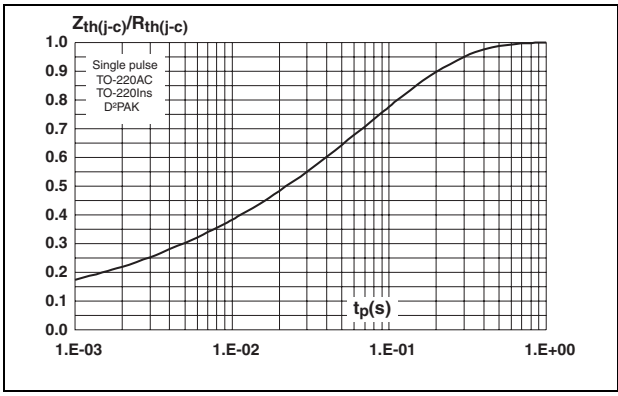
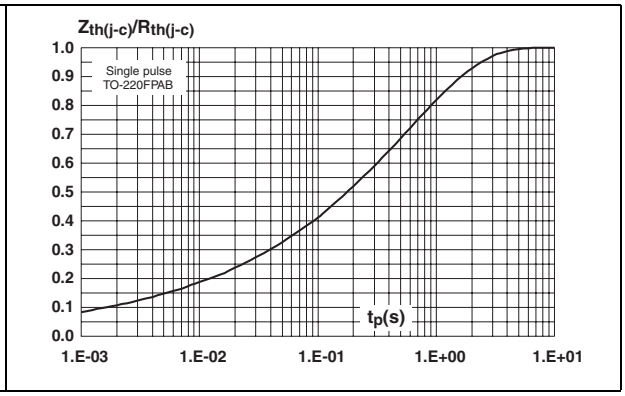


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration



3 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH1210D	STTH1210D	TO-220AC	1.86 g	50	Tube
STTH1210DI	STTH1210DI	TO-220Ins	1.86 g	50	Tube
STTH1210FP	STTH1210FP	TO-220FPAC	2.2 g	50	Tube
STTH1210G	STTH1210G	D^2PAK	1.48 g	50	Tube
STTH1210G-TR	STTH1210G	D^2PAK	1.48 g	1000	Tape & reel